



Kingseat Wastewater Treatment Plant 2024-2025 Annual Report

Final - September 2025

Watercare 


QUALITY INFORMATION

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REVISION HISTORY

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CONSENT CHANGE AND MONITORING HISTORY

Date	Change/Event	Notes
2021 Spring – 2022 Autumn	First year of REMP monitoring	Baseline ecological and water quality data collected under legacy authorisations.
Dec 2022	Resource consents DIS60401948 (discharge) and DIS60401927 (air) granted	Ten-year term expiring Dec 2032. Established discharge limits and formalised REMP requirements.
2023	Kingseat WWTP Management Plan finalised	Set out operational procedures, monitoring framework, and incident response protocols.
Sep 2025	Installation of new backwash filter system	Upgrade to improve TSS removal and enhance UV disinfection efficiency; no change to consent, but relevant to monitoring interpretation.

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LIST OF ABBREVIATIONS AND ACRONYMS

Abbreviation	Description
BOD ₅	5-day biochemical oxygen demand
cBOD ₅	5-day carbonaceous biochemical oxygen demand
DO	Dissolved oxygen
E. coli	Escherichia coli
HF183	Human-associated Bacteroides genetic marker
HumM2	Human mitochondrial DNA marker
I&I	Inflow and infiltration
IANZ	International Accreditation New Zealand
MST	Microbial Source Tracking
NH ₄ -N	Ammoniacal nitrogen (as NH ₄ ⁺), reported in mg N/L
NOx	Nitrite + nitrate (NO ₂ ⁻ + NO ₃ ⁻)
PI Historian	Process data historian used to store operational plant data
REMP	Receiving Environment Monitoring Programme
TIN	Total inorganic nitrogen (sum of NH ₄ ⁺ -N, NO ₂ ⁻ -N, and NO ₃ ⁻ -N)
TN	Total nitrogen
TP	Total phosphorus
TSS	Total suspended solids
UV	Ultraviolet disinfection
WWTP	Wastewater treatment plant

EXECUTIVE SUMMARY

This report presents the compliance and environmental monitoring results for the Kingseat Wastewater Treatment Plant (WWTP) for the period 1 July 2024 to 30 June 2025.

Key findings are as follows:

- **Compliance:** The WWTP largely complied with all consent conditions. One technical non-compliance was recorded for Total Suspended Solids (TSS), which slightly exceeded the 92nd percentile limit. All other parameters, including BOD₅, ammonia, dissolved oxygen, and *Escherichia coli*, remained within consented thresholds.
- **Effluent volumes:** Discharges remained well below the consented daily maximum of 38 m³/day, with an annual mean of ~20 m³/day.
- **Seasonality and trends:** Five-year analysis confirmed a seasonal signal in BOD₅, with higher concentrations in summer and early autumn linked to biological and process-related factors rather than flow effects. Long-term trends showed improving ammonia removal, stable BOD₅ and *E. coli*, and a weak but significant increase in TSS.
- **Complaints and incidents:** No odour complaints, unauthorised discharges, or bypasses were recorded during the reporting year.
- **Environmental sampling (REMP):** Monitoring in spring and autumn showed a localised effect at the mixing zone, with attenuation of nutrients and bacteria within 100–300 m downstream. Microbial Source Tracking (MST) markers indicated only limited human input, supporting the conclusion that most faecal contamination originates from agricultural runoff in the catchment. Autumn sampling was restricted to the effluent, mixing zone, and 300 m downstream due to dry stream conditions, consistent with previous years.
- **Upgrades:** A new backwash filter was installed in September 2025, enhancing TSS removal and indirectly improving UV disinfection effectiveness for *E. coli* control. The backwash filter performance will be evaluated over the coming year.

Overall, the plant continues to operate reliably, with generally stable effluent quality and limited environmental effects observed in the receiving stream.

1 INTRODUCTION

1.1 Resource Consents and Management Plans

Operation of the Kingseat Wastewater Treatment Plant (WWTP) is authorised under resource consents:

- **DIS60401948 – Discharge to water** (treated effluent to an unnamed tributary of the Taihiki River).
- **DIS60401927 – Discharge to air** (odour emissions).

Both consents were granted in December 2022 and expire in December 2032. They require Watercare Services Limited to monitor effluent quality, flows, and receiving environment conditions, and to provide annual and quarterly reporting to Auckland Council. Key obligations include:

- Compliance monitoring of flow and effluent quality against consented limits.
- Receiving Environment Monitoring Programme (REMP) to assess ecological effects.
- Incident response and reporting procedures.
- Management of potential odour emissions.

The consents include an annual review condition (Condition 5 review s128 RMA), enabling Auckland Council to vary consent requirements if significant adverse environmental effects are identified or if improvements in treatment technology become available.

1.2 WWTP Description

The WWTP is located at 16A Buchanan Road, Kingseat, serving approximately 44 residential properties in the township and surrounding catchment. Wastewater is entirely domestic in nature, conveyed by a small reticulated network.

The treatment process comprises the following stages:

- **Influent pumping**
- **Flow balancing:** a 30 m³ balance tank attenuates inflow variations, reducing shock loads.
- **Biological treatment:** a 49 m³ aeration tank where microorganisms degrade organic matter, supported by blower-supplied aeration and nitrification.
- **Clarification:** solids settle in a clarifier, with return activated sludge recirculated to maintain process stability.
- **Disinfection:** clarified effluent passes through a UV disinfection system (Wedeco LBX10), designed to achieve a 4-log pathogen reduction.
- **Final storage and reaeration:** a treated effluent tank and reaeration chamber provide final buffering and oxygenation before discharge.
- **Sludge management:** waste activated sludge is periodically removed and transported off-site (to Pukekohe WWTP) for further treatment.

A magnetic flowmeter continuously records effluent discharge volumes to demonstrate compliance with the consented daily maximum of 38 m³/day.

2 COMPLIANCE WITH DISCHARGE CONSENT

2.1 Introduction

Compliance was assessed against the conditions of resource consent DIS60401948. Watercare's self-assessment framework categorises compliance as follows:

- **Category 1:** Full compliance.
- **Category 2:** Technical non-compliance or no more than minor adverse effect.
- **Category 3:** Non-compliance with potential minor adverse effects, or repeated Category 2.
- **Category 4:** Non-compliance with potential significant adverse effects, or repeated Category 3.

2.2 Method Statement

Compliance was assessed using a combination of operational data, laboratory analysis, and receiving environment monitoring in accordance with the consent conditions. All operational data were sourced from the PI Historian system, with specific data IDs and tags listed in Appendix C:

- **Flow monitoring:** Daily discharge volumes were recorded by a magnetic flow meter (Condition 16), linked to SCADA for continuous logging. Data were checked for anomalies, with calibration and maintenance undertaken as per manufacturer's requirements. Flow compliance was assessed against Condition 7, using daily values and applying the rainfall exclusion (≥ 10 mm in 24 h).
- **Effluent quality monitoring:** Samples were collected monthly from the final effluent (Condition 17). Laboratory analysis was undertaken by the Watercare Laboratory (IANZ-accredited), using Standard Methods (Condition 19). Parameters tested included biochemical oxygen demand (BOD₅), total suspended solids (TSS), ammonia (NH₃-N), dissolved oxygen (DO), and *Escherichia coli* (*E. coli*). Compliance was determined against the rolling 92nd percentile or minimum limits specified in Condition 18.
- **Receiving environment monitoring:** Assessments were undertaken in March and September as required by Conditions 20–21. Water samples were collected upstream and downstream of the discharge point and analysed for nutrients, BOD₅, DO, and *E. coli*. Photographic records were taken at prescribed transects to assess visible changes in the stream and riparian vegetation. Where dry stream conditions limited monitoring (autumn 2025), the limitation was documented. Microbial Source Tracking (MST) was applied in 2024–25 as a supplementary tool to identify bacterial sources.
- **Statistical analysis:** Seasonal differences were assessed using non-parametric Kruskal–Wallis tests. Long-term trends¹ (2020–2025) were evaluated with Mann–Kendall and Sen slope estimators, recognising the short record length for some parameters.

¹ Trend analyses are based on a relatively short dataset (five years), which limits the ability to detect robust long-term changes. Typically, a record of ten years or more is needed for strong statistical confidence. The non-parametric methods applied (Mann–Kendall and Sen slope) are appropriate for environmental data and provide a useful indication of potential directions of change. Results should therefore be regarded as indicative only — highlighting tentative patterns that can help guide future monitoring and assessment, rather than conclusive evidence of long-term improvement or decline.

2.3 Incident and complaint logs

Plant malfunctions and odour complaints (if any) were logged and reviewed in accordance with Condition 13 and Condition 26. None were recorded in 2024–25.

2.4 Effluent Volumes

The WWTP is authorised to discharge up to 38 m³/day of treated effluent to an unnamed tributary under Condition 7 of consent DIS60401948. Flows are monitored continuously via SCADA and reported as daily discharge volume.

2.4.1 Reporting year results (2024–2025)

During the reporting period, effluent discharges remained within the consented maximum daily limit. The annual mean daily discharge was approximately 20 m³/day, with higher flows recorded during wet-weather months. No flow-related exceedances were observed.

- Figure 3-1 shows the daily effluent discharge volumes and rainfall for 2024–2025, with the consent limit (38 m³/day) indicated by the red line. The 98th percentile discharge was 55.9 m³/day. While some daily flows exceeded 38 m³/day, all such events coincided with rainfall ≥ 10 mm or occurred within 24 hours of such rainfall. Under Condition 7 of the consent, these days are excluded from compliance assessment, and the plant therefore remained compliant throughout the reporting period.
- Figure 3-2 presents seasonal polar plots of rainfall and discharge, highlighting winter–spring peaks and lower flows during summer–autumn.

2.4.2 Seasonal patterns

Discharge volumes followed rainfall-driven inflow and infiltration (I&I). The polar plot (Figure 3-2) illustrates that June–August exhibited the highest average daily discharges, while late summer (January–March) remained low and stable. This pattern aligns with the rainfall cycle observed for the Kingseat area.

Rainfall and effluent discharge volumes from Kingseat WWTP (2024-2025)

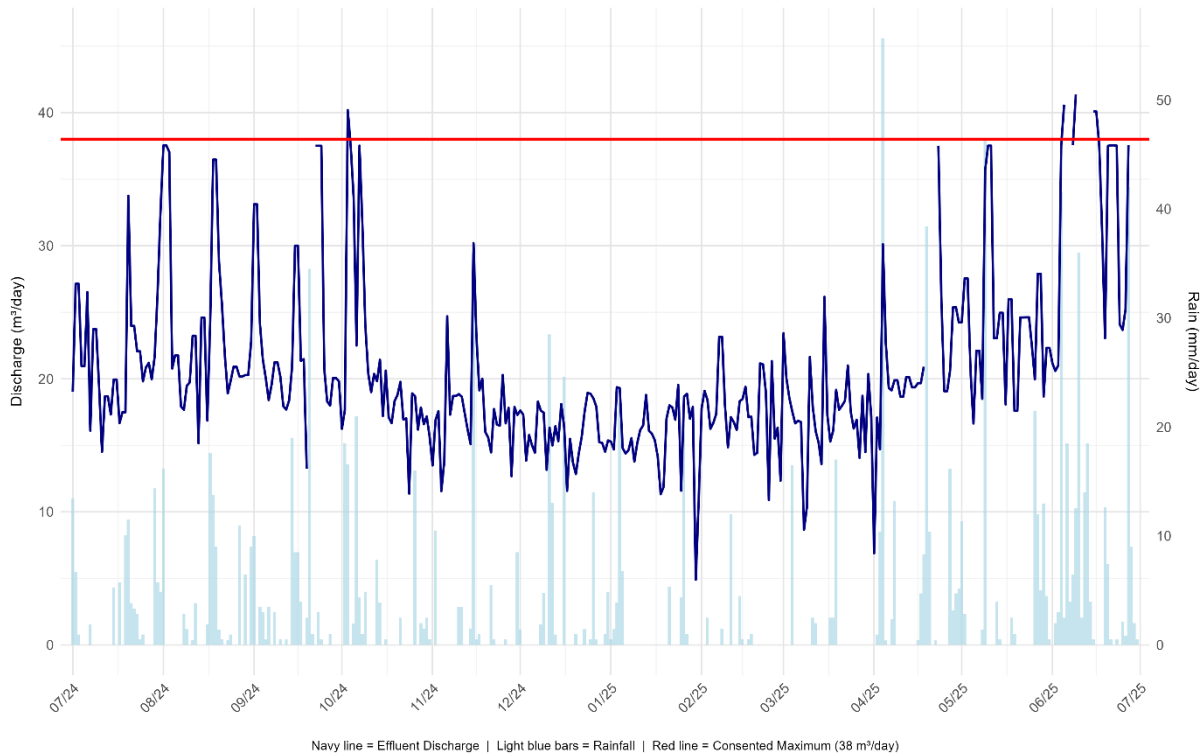
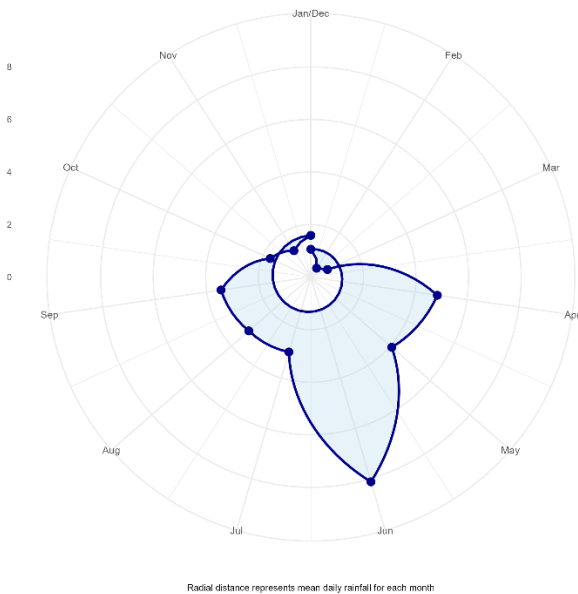


Figure 3-1. Rainfall and daily effluent discharge volumes at Kingseat WWTP for the period July 2024 – June 2025. The red line indicates the consented maximum daily discharge (38 m³/day).

Seasonal Rainfall Cycle - Kingseat Area (2024-2025)
Monthly mean daily rainfall (mm/day)



Seasonal Discharge Cycle - Kingseat WWTP (2024-2025)
Monthly mean daily discharge (m³/day)

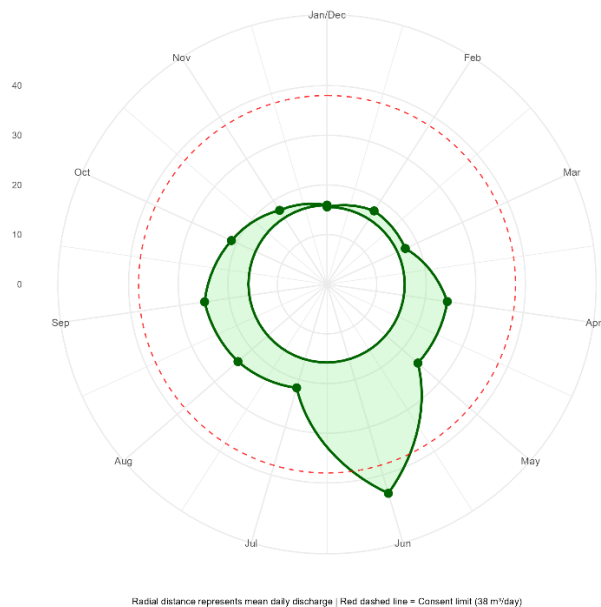


Figure 3-2. Seasonal cycles of rainfall (left) and effluent discharge (right) at Kingseat WWTP, July 2024 – June 2025. Polar plots show monthly mean daily values. Radial distance represents the mean daily value for each month; peaks and troughs denote wetter/drier or higher/lower discharge periods. The alignment of shapes shows hydrological coupling, while differences in shape and timing reflect system lag and catchment response. Red dotted line indicates consented limit.

2.5 Effluent Quality

2.5.1 Monitoring overview

Effluent quality was monitored at the Post-UV discharge point, as required by consent conditions. Parameters include BOD₅, TSS, ammonia (NH₃-N), E. coli, and dissolved oxygen (DO). Limits are set for the 92nd percentile or minimum values (Table 2-2 of the consent). Supporting parameters such as pH and temperature were also measured.

2.5.2 Compliance summary

The compliance status for the reporting period is summarised in Table 3-1. Key findings:

- The BOD₅, DO, NH₃-N, and E. coli were compliant with consent limits.
- The TSS exceeded the 92nd percentile limit (30.6 mg/L vs limit 30 mg/L). This was recorded as a Category 2 (minor) non-compliance.
- pH and temperature showed normal operational ranges but are not subject to consent limits.

Table 3-1. Effluent compliance summary data (2024–2025). Yellow indicates the consent limits, green indicates compliance, and red indicates non-compliance.

Statistic	Volume	DO	BOD ₅	TSS	NH ₃ -N	E. coli
Unit	m ³ /day	mg O ₂ /L	mg/L	mg/L	mg N/L	MPN/100 mL
Samples	365	30	27	27	27	27
Minimum	0	6.8	0.78	1.0	0.012	1.6
Mean	20	8.87	2.74	16.6	2.87	16.8
Maximum	91.1	11.6	11.0	39.0	74.0*	230
Median	19	8.71	2.0	15.0	0.07	1.6
92%ile	28	11.2	5.37	30.6	0.40	48.1
92%ile limit		≥5	≤20	≤30	≤5	≤200
Maximum limit	≤38	–	–	–	–	–
Compliant	Yes	Yes	Yes	No	Yes	Yes

* The unusually high NH₃-N maximum value (74 mg/L) was confirmed by the laboratory but is considered anomalous and likely reflects a sampling or analytical error. It has been retained in the dataset for completeness but should be interpreted with caution.

2.5.3 Concentration patterns

Time-series plots of effluent quality parameters (Figure 3-3) show:

- TSS spiked intermittently, with exceedances contributing to the 92nd percentile breach.
- E. coli levels remained low, with a marked improvement compared to 2023–2024, when exceedances occurred.

- **NH₃-N concentrations were consistently well below the consent limit.** A single extreme outlier (74 mg/L) was reported, but this is considered unlikely to represent actual plant performance. Dissolved oxygen levels remained consistently high (≥ 5 mg/L), supporting effective nitrification, and no signs of reduced oxygen occurred at the time of sampling. This suggests the elevated result was most likely due to analytical or sampling error rather than a true change in treatment performance
- DO and pH tracked within expected seasonal ranges.

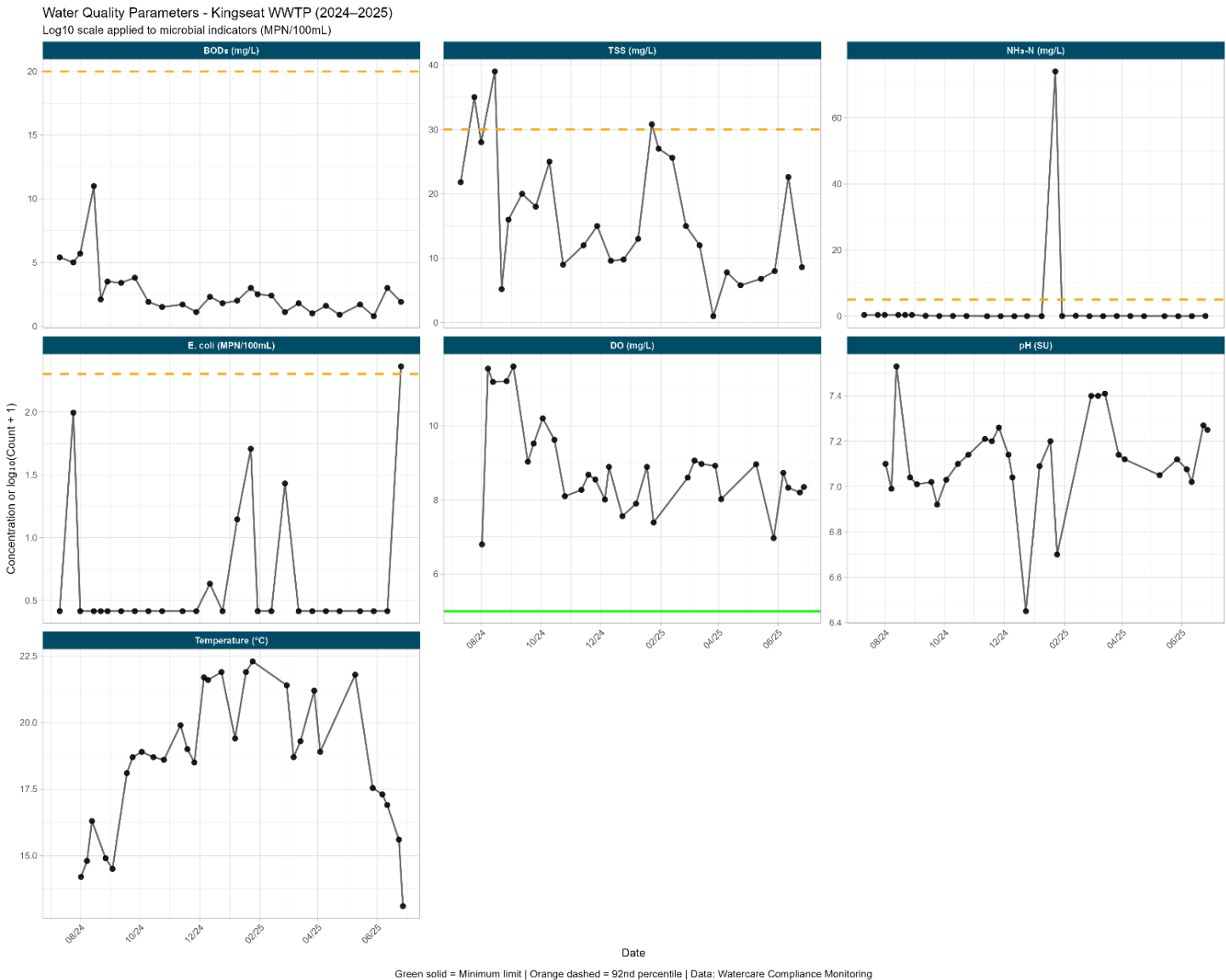


Figure 3-3. Temporal variation in effluent quality parameters at Kingseat WWTP (2024–2025). Orange dashed lines indicate 92nd percentile limits; the green line shows the minimum limit for dissolved oxygen (DO).

2.5.4 Seasonality analysis

Seasonal analysis was undertaken using the five-year dataset (July 2020 – June 2025) for BOD₅, TSS, NH₃-N, and *E. coli*. DO, pH, and temperature were excluded due to shorter data records. Kruskal–Wallis tests identified a significant seasonal signal in BOD₅ ($p < 0.001$), with higher concentrations

during summer and early autumn (Figure 3-4). Likely drivers include warmer temperatures, increased biological activity, and higher algal productivity in the receiving stream, which can elevate measured BOD₅. While higher holiday inflows can shorten retention in some systems, at Kingseat effluent volumes peak in winter–spring, suggesting that the seasonal BOD₅ pattern is primarily biological rather than flow-driven. No significant seasonal variation was detected for the other parameters.

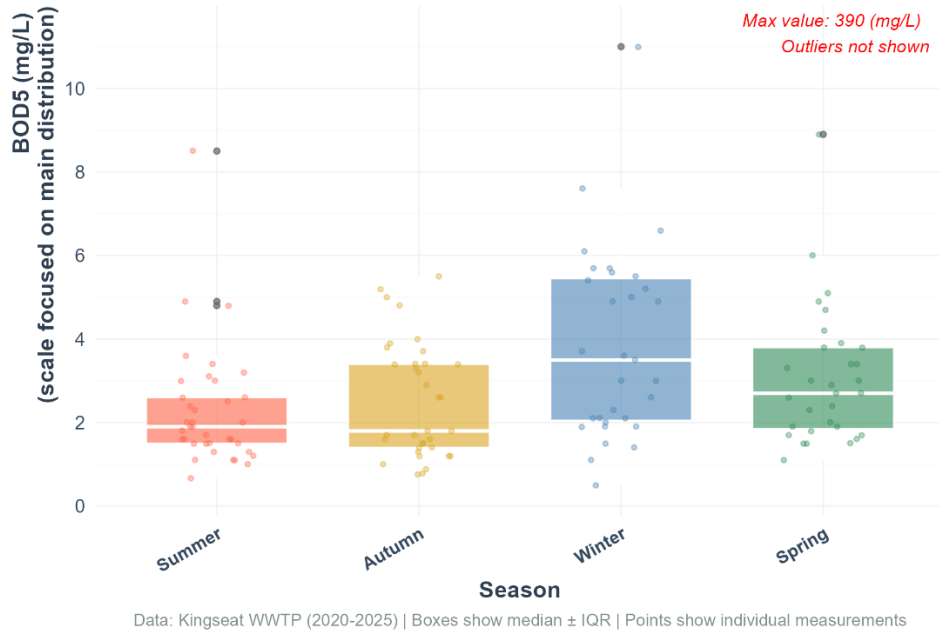


Figure 3-4. Seasonal variation in BOD₅ concentrations at Kingseat WWTP (2020–2025). Boxes show median and interquartile range (IQR), points represent individual results.

2.5.5 Long-term trends (2020-2025)

Trend analysis over the past five years (Figure 3-5) was undertaken using Mann–Kendall tests with Sen slope estimation to identify monotonic ²changes in parameter concentrations. Parameters such as DO, pH, and temperature were excluded from this analysis because only three years of consistent data were available. Results indicate:

- **NH₃-N:** Strong decreasing trend ($p < 0.001$), suggesting sustained improvement in nitrification performance.
- **TSS:** Weak but statistically significant increasing trend ($p < 0.05$), potentially indicating the need for ongoing operational focus on solids removal.
- **BOD₅ and E. coli:** Stable with no significant trend.

² “Monotonic” means a variable consistently increases or decreases over time, without requiring the change to be linear. The Mann-Kendall test detects a persistent upward or downward direction in the data, even if year-to-year values fluctuate

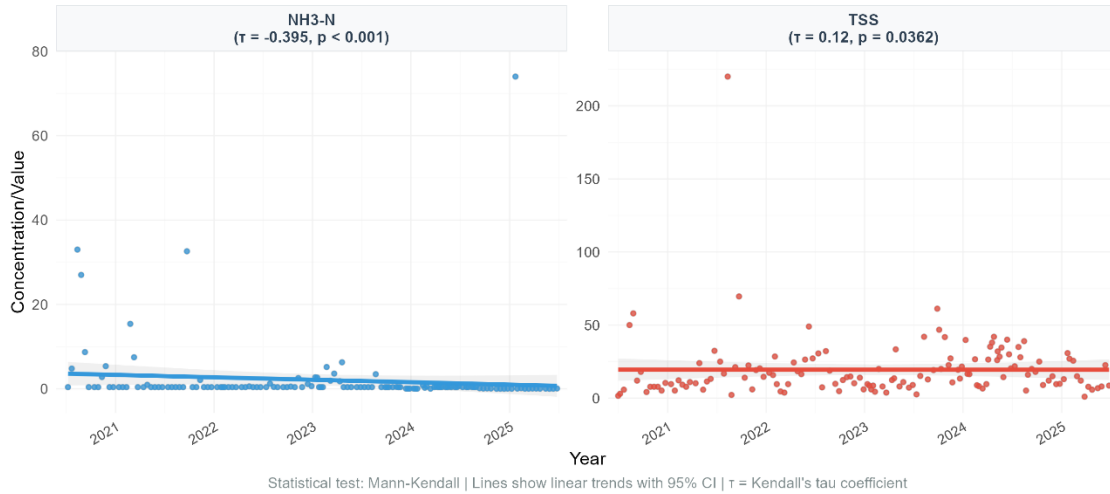


Figure 3-5. Five-year trends in effluent quality parameters at Kingseat WWTP (2020–2025). Statistically significant results were detected for NH₃-N (decreasing) and TSS (increasing) using Mann–Kendall trend tests

2.5.6 Summary

Overall, effluent quality at Kingseat WWTP in 2024–2025 was consistent with consent requirements, except for TSS which slightly exceeded the 92nd percentile limit. BOD₅, NH₃-N, DO, and *E. coli* remained well within consented thresholds, and ammonia showed a clear improving trend over the five-year record. Seasonality analyses confirmed elevated BOD₅ in warmer months, likely linked to biological processes rather than flow-related effects, while long-term trends highlighted stable BOD₅ and *E. coli*, improving NH₃-N, and a weak but significant increase in TSS. These results indicate generally stable plant performance with one area of ongoing operational focus (TSS).

2.6 Complaints and Incidents

No odour complaints were recorded under the air discharge consent (DIS60401927) during the 2024–2025 reporting period.

No unauthorised discharges, spills, or bypass events occurred.

3 ENVIRONMENTAL SAMPLING (REMP)

3.1 Monitoring Overview

- Biannual sampling undertaken in spring (October 2024) and autumn (March 2025).
- **Sites:** upstream (U/S), discharge mixing zone, and downstream (10 m, 50 m, 100 m, 300 m). Post-UV included for reference.
- **Parameters:** physicochemical (pH, DO, BOD₅), nutrients (NH₃-N, NO_x, TIN), microbiological (*E. coli*), and microbial source tracking (HF183, HumM2 when applicable³).
- Methods aligned with consent conditions and REMP requirements.

For the October 2024 sampling, the device used for *in situ* measurements (DO and temperature) and photographic records was water-damaged before data could be backed up. As a result, most spring DO data are unavailable, and no photographic record was retained for this survey.

3.2 Results and Interpretation

Results from the 2024–2025 REMP sampling are summarised in Tables 4-3a and 4-3b. Seasonal and spatial comparisons are illustrated in Figures 4-1 to 4-3. Boxplot comparisons and site analyses were based on a four-year dataset (2021–2025) to provide sufficient replication.

Sampling in autumn was constrained by extended dry conditions. Several upstream and mid-reach sites were dry, and water was not artificially extracted from sediments to avoid biasing TSS or bacterial measurements. Consequently, autumn sampling was limited to the post-UV effluent, discharge mixing zone, and 300 m downstream site. Similar limitations were also reported in 2023–2024, reflecting that the receiving channel does not always function as a continuous stream under dry conditions. Appendix D provides a photographic record of the March 2025 (autumn) sampling sites only. No photographs are available for October 2024 due to device failure.

- **Seasonal patterns (Figure 4-1):** BOD₅, nutrients (NH₄-N, NO_x, TIN), and *E. coli* were consistently higher in autumn than in spring, reflecting reduced dilution and low-flow conditions. Dissolved oxygen was higher in spring, consistent with greater aeration during wetter periods.
- **Spatial patterns (Figures 4-2 and 4-3):** Concentrations of *E. coli*, NH₄-N, NO_x, and TIN were elevated at the discharge mixing zone but declined downstream, indicating that the effluent is a localised source of microbial and nutrient inputs. Attenuation processes were evident within 100–300 m of the discharge. Physicochemical parameters such as pH and DO showed no marked spatial variation and remained within ranges typical for small lowland streams.
- **Microbial Source Tracking (MST):** Human markers HF183 and HumM2 were tested only in the autumn survey as an additional investigation to better understand the source of faecal contamination. Both markers were detected at the discharge mixing zone but were absent downstream. Their limited detection, despite elevated *E. coli* counts, suggests that human wastewater is not the dominant contributor to bacterial contamination. Instead, the results

³ HF183 and HumM2 are human-associated microbial source tracking markers. Although not required by the consent, they were added in the autumn 2025 survey to help identify whether elevated *E. coli* levels originate from the WWTP discharge or from other sources such as agricultural runoff from surrounding farmland.

support the interpretation that faecal contamination is largely attributable to agricultural runoff, consistent with the surrounding land use.

Overall, the receiving environment continues to reflect the combined influence of treated effluent inputs and catchment land use, with animal sources likely being the major driver of bacterial contamination under low-flow conditions.

Table 4-3a. Receiving environment monitoring results at Kingseat WWTP Spring (October 2024).

Arrows indicate changes compared to 2023–2024 (↑ increase, ↓ decrease, = no change).

Parameter	Post-UV	U/S	Discharge mixing zone	10 m D/S	50 m D/S	100 m D/S	300 m D/S
pH (SU)	7.1 (=)	6.2 (↓)	7.0 (=)	6.3 (=)	6.7 (=)	6.7 (=)	7.1 (=)
cBOD ₅ (mg/L)	2.7 (=)	1.2 (↓)	2.4 (=)	1.2 (↓)	<0.5 (↓)	0.66 (=)	<2.0 (↓)
NHX (mg/L)	0.078 (=)	0.022 (=)	0.066 (=)	0.016 (=)	0.014 (=)	0.028 (=)	0.012 (=)
NOx (mg/L)	5.57 (↑)	0.379 (↑)	1.88 (↑)	0.384 (↑)	0.357 (↑)	0.299 (↑)	0.176 (↑)
TIN (mg/L)	38 (↑)	1.6 (=)	16 (↑)	3.8 (↑)	4.6 (↑)	4.4 (↑)	2.7 (↑)
E. coli (cfu/100 mL)	21 (=)	140 (↓)	910 (↓)	350 (↓)	120 (↓)	190 (↓)	170 (↓)
DO (%)	–	–	–	–	–	–	96 (=)

Table 4-3b. Receiving environment monitoring results at Kingseat WWTP Autumn (March 2025).

Missing data downstream reflects dry stream conditions.

Parameter	Post-UV	U/S	Discharge mixing zone	10 m D/S	50 m D/S	100 m D/S	300 m D/S
pH (SU)	7.5 (=)	–	7.4 (=)	–	–	–	7.7 (=)
cBOD ₅ (mg/L)	1.6 (=)	–	6.5 (↑)	–	–	–	1.2 (=)
NHX (mg/L)	0.087 (=)	–	0.580 (↑)	–	–	–	0.017 (=)
NOx (mg/L)	3.97 (↑)	–	8.60 (↑)	–	–	–	4.68 (↑)
TIN (mg/L)	43 (↑)	–	59 (↑)	–	–	–	15 (↑)
E. coli (MPN/100 mL)	4.9 (↓)	–	410,000 (↑)	–	–	–	31,000 (↑)
DO (%)	70 (=)	–	98 (=)	–	–	–	–
HF183 (copies/100 mL)	–	–	26,000,000 (↑)	–	–	–	<900 (=)
HumM2 (copies/100 mL)	–	–	1,700,000 (↑)	–	–	–	<900 (=)

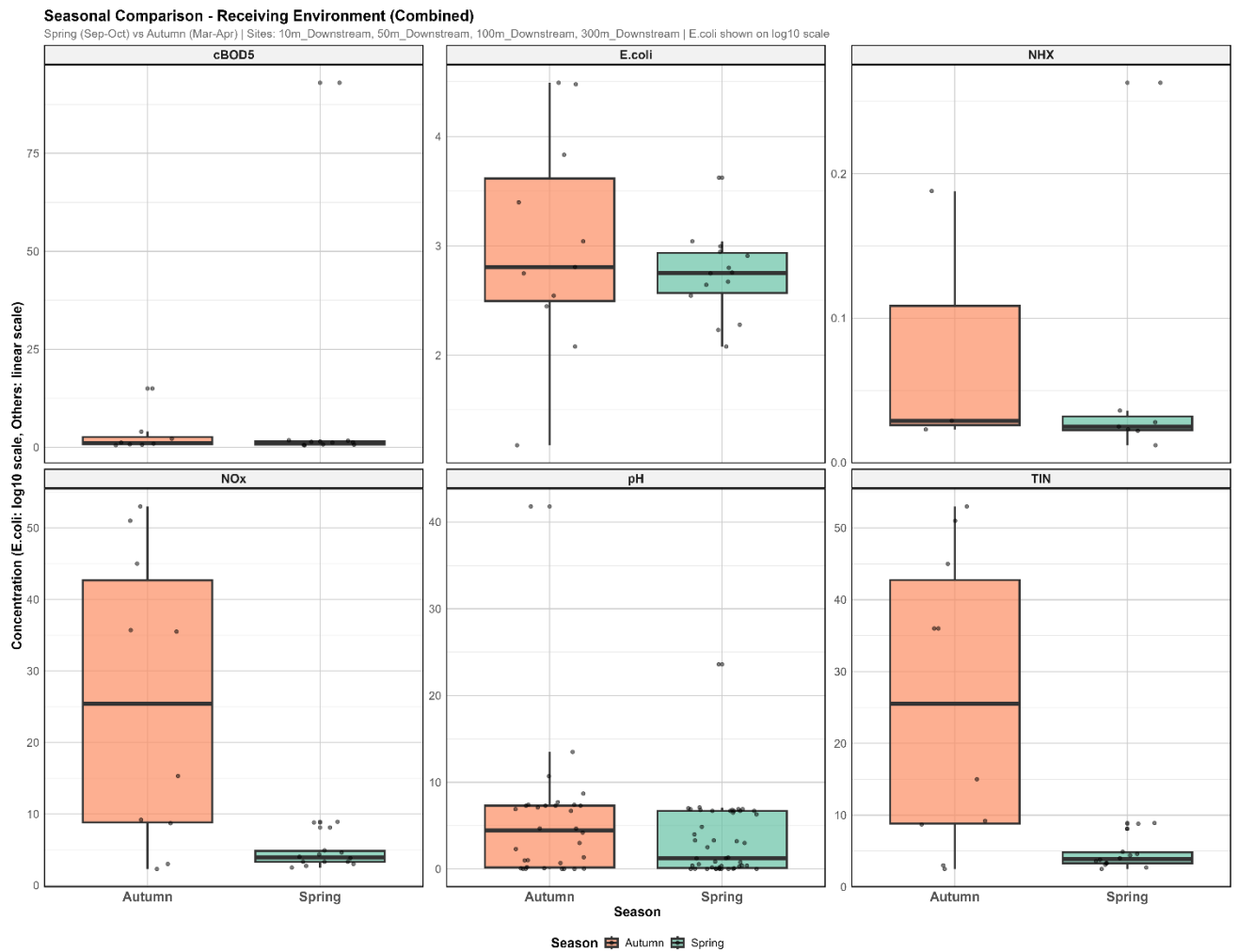


Figure 4-1. Boxplots showing seasonal comparison of receiving environment water quality parameters at Kingseat WWTP (2021–2025).

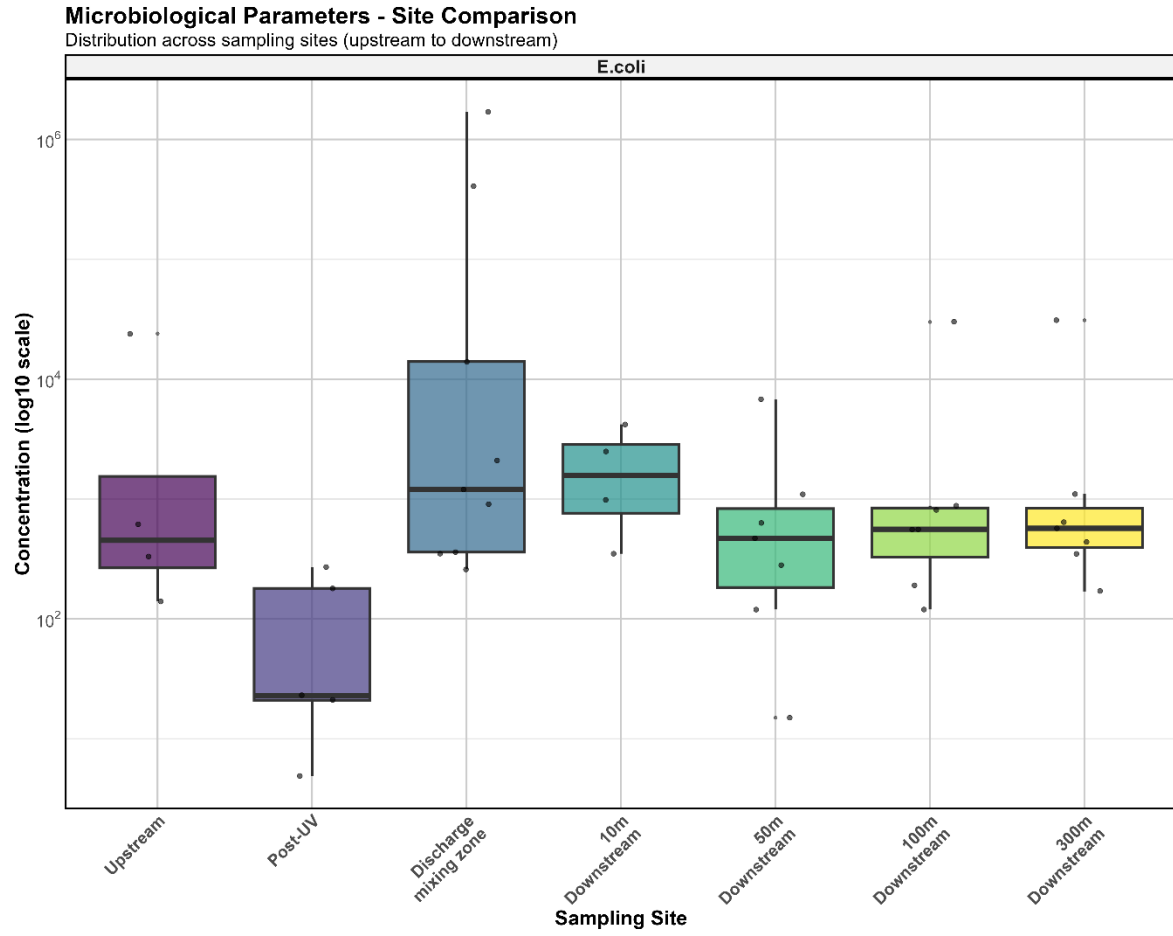


Figure 4-2. Boxplots showing spatial comparison of microbiological water quality (*E. coli*) at Kingseat WWTP (2021–2025).

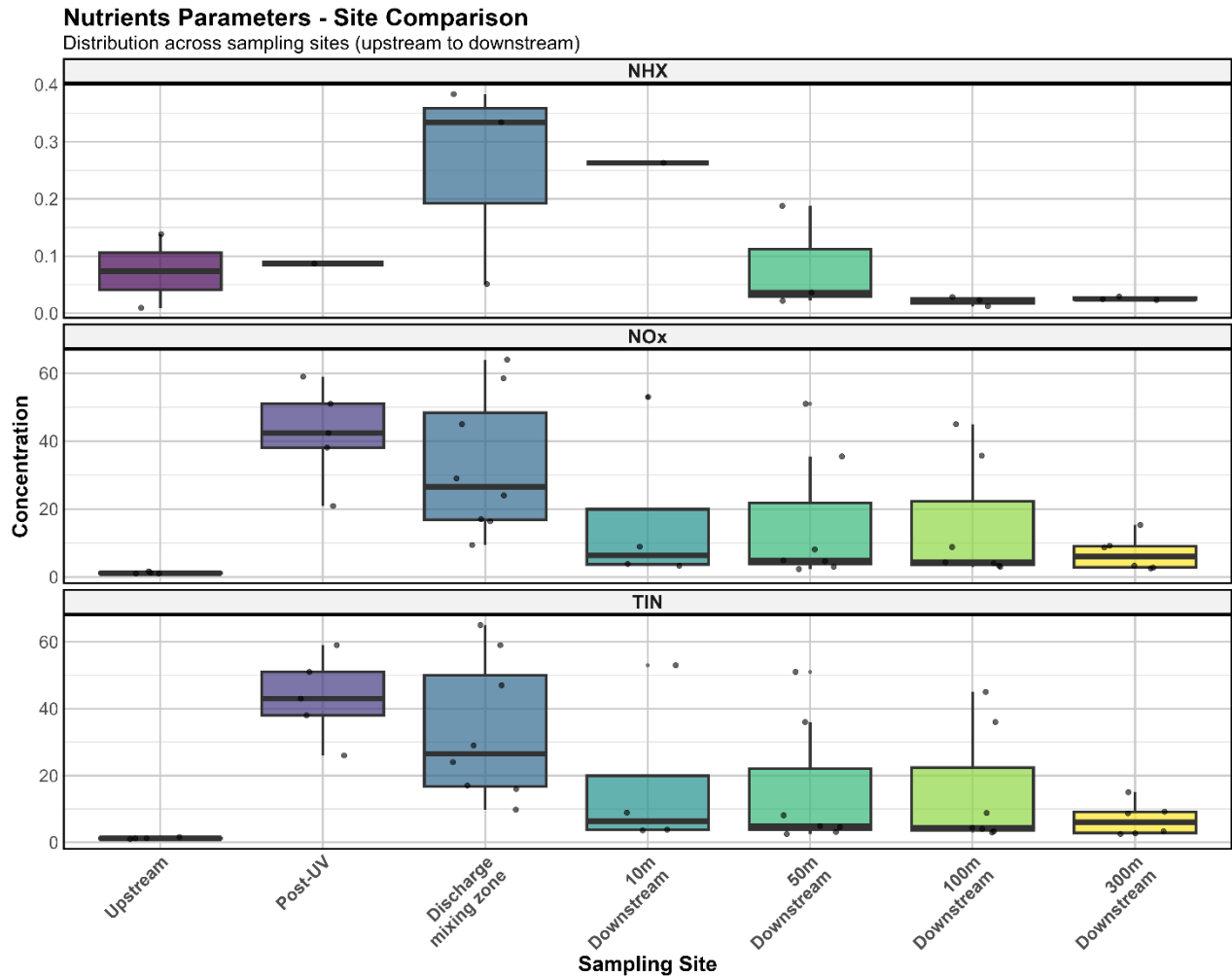


Figure 4-3. Boxplots showing spatial comparison of nutrient concentrations (NH_x, TON, TIN) at Kingseat WWTP (2021–2025).

3.3 Discussion

The 2024–2025 REMP results indicate that the WWTP discharge exerts a localised influence on receiving water quality, with elevated nitrogen species (NH₄-N, NO_x, TIN) detected at the mixing zone but declining within 100–300 m downstream. Seasonal differences were evident, with higher nutrient concentrations in autumn reflecting low-flow conditions and reduced dilution. Microbial Source Tracking showed limited human-associated markers, supporting the interpretation that faecal contamination is primarily from agricultural runoff rather than the treatment plant. These findings are consistent with previous years and highlight both the effectiveness of downstream attenuation and the ongoing influence of wider catchment land use. Persistent dry conditions during autumn remain a key limitation for monitoring, as the receiving channel does not consistently function as a flowing stream.

4 UPGRADES AND FUTURE ACTIONS

A major operational upgrade was completed with the installation of a new backwash filter system, commissioned on 2 September 2025. The system improves removal of Total Suspended Solids (TSS), which provides a twofold benefit: reduced particulate loading to the receiving environment and enhanced UV disinfection efficiency. With fewer suspended particles shielding bacteria from UV exposure, the treatment process can achieve more effective inactivation of *E. coli*.

Compared with the previous fixed filter, the backwash design offers clear advantages. Periodic reverse-flow flushing prevents clogging, maintains consistent flow, and extends media life. This self-cleaning feature ensures more reliable solids removal over time, reducing operational downtime and maintaining stable effluent quality.

No further upgrades are currently scheduled. Performance of the backwash filter will be monitored over the next year to evaluate its contribution to long-term improvements in effluent quality and compliance assurance.

5 CONCLUSION

The 2024–2025 monitoring period demonstrated continued effective performance of the WWTP. Compliance with discharge consents was maintained for all parameters except for a minor exceedance of the TSS 92nd percentile limit. Seasonal and trend analyses highlighted the importance of biological factors influencing BOD₅, while ammonia showed improvement over the five-year record.

Receiving environment monitoring indicated that the discharge exerts only a localised influence, with downstream attenuation of nutrients. Microbial Source Tracking results indicated that treated effluent is not the dominant contributor to bacterial contamination in the stream, reinforcing the role of agricultural land use in shaping water quality.

No complaints or incidents were recorded, and the commissioning of a new backwash filter represents a positive upgrade that will further strengthen solids removal and disinfection efficiency.

The commissioning of a new backwash filter in September 2025 is expected to strengthen solids removal and UV disinfection performance, with effectiveness to be evaluated in the next reporting period.

In summary, the Kingseat WWTP is performing effectively, with robust compliance and monitoring systems in place to manage potential effects on the receiving environment.

Appendix A. Assessment of Compliance

Table A-1 Assessment of Compliance with Consent Conditions – Kingseat WWTP

Condition Number	Consent Conditions - Kingseat DIS60401948 (wastewater discharge) and DIS60401927 (air discharge)	Compliance Rating	Comments
01	The consents must be carried out in accordance with the documents and drawings and all supporting additional information submitted with the application, as detailed in the consent, and all referenced by the council as resource consent numbers DIS60401948 and DIS60401927.	1	Compliant
02	Under section 125 of the RMA, these consents lapse five years after the date they have been granted unless: a. The consents are given effect to; or b. The council extends the period after which the consents lapse.	1	Compliant
03	The consent holder must pay the council an initial consent compliance monitoring charge of \$1,026 (inclusive of GST), plus any further monitoring charge or charges to recover the actual and reasonable costs incurred to ensure compliance with the conditions attached to this consent.	1	Compliant
04	Wastewater Discharge Permit DIS60401948 and Air Discharge Permit DIS60401927 must expire on 31 December 2032 unless they have lapsed, been surrendered or been cancelled at an earlier date pursuant to the RMA.	1	Compliant

Condition Number	Consent Conditions - Kingseat DIS60401948 (wastewater discharge) and DIS60401927 (air discharge)	Compliance Rating	Comments
05	<p>Under section 128 of the RMA, the conditions of these consents may be reviewed by the council at the consent holder's cost: In October 2023 and every year thereafter following commencement of consent in order:</p> <p>i. To vary the size or design of the treatment system and method of discharge in light of increased understanding of the system or further information, changed circumstances, or the results of monitoring; and/or</p> <p>ii. To alter monitoring requirements in light of previous monitoring results and/or changed environmental conditions or circumstances; and/or</p> <p>iii. To deal with any significant adverse effect on the environment which may arise from the exercise of the consent and which was not apparent at the time of the granting of the consent; and/or</p> <p>iv. To require the consent holder to adopt the best practicable option to remove or reduce any adverse effect on the environment, including measures to improve influent quality or influent volume and/or to make alterations to improve treatment plant efficiency and/or to reduce I&I into the plant and/or to improve discharge quality and/or discharge regime.</p>	1	Compliant
06	<p>Access to the relevant parts of the site properties must be maintained and be available at all reasonable times to enable the servants or agents of the council to carry out inspections, surveys, investigations, tests, measurements or take samples.</p>	1	Compliant
07	<p>Authorised Discharge Quantity - The discharge flow volume shall not exceed 38 cubic metres per day, in 98% of all daily flow readings, excluding all flow readings on days of or within 24 hours of 10mm rainfall or greater.</p>	1	Compliant

Condition Number	Consent Conditions - Kingseat DIS60401948 (wastewater discharge) and DIS60401927 (air discharge)	Compliance Rating	Comments
08	<p>The key system components shall be of at least the following dimensions and standards, or better:</p> <p>(a) Aerated Wastewater Treatment System comprising of: (1x) Lift Station; (1x) 30 m3 Flow Balancing Tank (1x) 49m3 Activated Sludge Aeration Tank; (1X) 2.5m Diameter Clarifier; (1x) UV Disinfection system (self cleaning and including intensity sensor with digital output); (1X) 30 m3 Activated Sludge Storage Tank (WAS Tank) (1x) Remote Telemetric Unit (within an enclosed cabinet)</p> <p>(b) Discharge Structure comprising: (1x) Discharge outlet pipe discharging into an intermittent stream at 1759450mE 5890190mN;</p>	1	As designed
09	<p>The installation of wastewater treatment system upgrades shall be carried out under the supervision of a chartered professional engineer or appropriately qualified person, experienced in wastewater treatment and land disposal systems.</p>	1	As supervised
10	<p>The design and installation of any new system components must be carried out under the supervision of a chartered professional engineer or other appropriately qualified person experienced in the design and installation of wastewater treatment systems. Within three months of commencement of this consent, and within three months following the completion of any additional or replacement key system components, the supervising engineer/person must inspect all the new works and must certify in writing to the council that all additional components of the wastewater treatment system have been designed, inspected and installed in accordance with standard engineering practice and with the plans provided pursuant to condition 1 and any other plans or specifications required by the conditions of this consent.</p>	1	Completed

Condition Number	Consent Conditions - Kingseat DIS60401948 (wastewater discharge) and DIS60401927 (air discharge)	Compliance Rating	Comments
11	Within three months of commencement of this consent, the consent holder must confirm whether any changes to the wastewater network have been made and provide the council with an updated plan of the wastewater network connected to the plant, indicating properties connected to the wastewater reticulation system draining to the treatment plant.	1	Plan updated and provided to Council.
Plant Operation Conditions			
12	Trade Waste - No trade waste or non-domestic wastes shall be discharged to the treatment plant at any time.	1	Covered by Trade Waste bylaw.
13	Contingency Provisions - All complaints received and system malfunctions regarding the wastewater treatment system must be logged by the consent holder. The consent holder must report this information to the council with the annual report required by condition 24 and must include an outline of action taken and any further action(s) proposed to remedy any such problems.	1	Compliant

Condition Number	Consent Conditions - Kingseat DIS60401948 (wastewater discharge) and DIS60401927 (air discharge)	Compliance Rating	Comments
14	<p>Management Plan Conditions</p> <p>14. A management plan for the wastewater treatment and disposal system must be prepared to enable compliance with the conditions of these consents and as necessary to ensure that any adverse effects on the environment are minimised. The plan must be forwarded to the council for approval within 3 months of commencement of these consents. The Management Plan must be in accordance with the conditions of these consents and is to cover the following:</p> <ul style="list-style-type: none"> a. Reticulated Area – detailing the current and proposed future reticulated areas which the plant will service; b. UV Operations Plan - explaining how the UV system is designed and operated to achieve a 4-log reduction of bacteria and viruses through the wastewater treatment plant; <p>Management Plan Conditions</p> <p>14. A management plan for the wastewater treatment and disposal system must be prepared to enable compliance with the conditions of these consents and as necessary to ensure that any adverse effects on the environment are minimised. The plan must be forwarded to the council for approval within 3 months of commencement of these consents. The Management Plan must be in accordance with the conditions of these consents and is to cover the following:</p> <ul style="list-style-type: none"> a. Reticulated Area – detailing the current and proposed future reticulated areas which the plant will service; b. UV Operations Plan - explaining how the UV system is designed and operated to achieve a 4-log reduction of bacteria and viruses through the wastewater treatment plant; 	1	<p>The Kingseat WWTP has a single management plan that relates to its resource consent. Watercare recently updated the plan in July 2023 and provided a copy to Auckland Council.</p>

Condition Number	Consent Conditions - Kingseat DIS60401948 (wastewater discharge) and DIS60401927 (air discharge)	Compliance Rating	Comments
15	The consent holder must comply with the requirements of the approved management plan. All subsequent significant updates to the approved plan throughout the term of this consent must be submitted to Auckland Council for review and feedback.	1	Compliant.
Monitoring and Reporting Conditions			
16	Flow Monitoring - The consent holder must measure effluent discharge flow volume from the plant continuously. The flow measuring device must be capable of providing cumulative measurements to an accuracy of plus or minus 5%. The meter must be installed in accordance with the manufacturer’s specifications and must be maintained in good working order at all times. The flow meter must be read on the same time of each consecutive day and the results recorded.	1	Ongoing.
17	Sample Monitoring - The consent holder must collect a sample of the discharge on the same day and time of each consecutive month, in accordance with the date specified in the approved management plan and the samples must be analysed for the following parameters specified in condition 18.	1	Ongoing.
18	Discharge Quality Standards - The consent holder must ensure that the quality of the wastewater discharged is equal to or better than the following parameter concentrations: Parameter Maximum 92 Percentile (Rolling Limit) ¹ Biochemical Oxygen Demand(BOD5) 20 mg/L Total Suspended Solids (TSS) 30 mg/L Dissolved Oxygen (DO) 5 mgO/L Ammonia (NH3) 5 mgN/L Escherichia Coli (E.coli) 200 MPN (or CFU) /100ml 1 The rolling limit is based on the past 12 monthly samples (taken over the previous 12 months).	2	92-percentile TSS limits not achieved during reporting year. Non-compliance was identified through routine monitoring; ongoing operational improvements (e.g. installation of backwash filter in September 2025) are expected to reduce exceedances in future years

Condition Number	Consent Conditions - Kingseat DIS60401948 (wastewater discharge) and DIS60401927 (air discharge)	Compliance Rating	Comments
19	<p>Monitoring Methods</p> <p>19. Samples required by condition 18 and condition 21 must be collected and analysed in accordance with the latest edition of “Standard Methods for the Examination of Water and Wastewater”, published by the American Public Health Association, the Water Environment Federation, and the American Water Works Association or to an equivalent standard approved in writing by Auckland Council. Sample analysis must be undertaken by an IANZ accredited laboratory.</p>	1	Compliant.
20	<p>Environmental Monitoring - The consent holder shall collect photographic records in March and September each year of the watercourse and surrounding vegetation, at the following locations:</p> <ul style="list-style-type: none"> i. 1 site 10m or less upstream of the discharge point; ii. 3 sites along the stream in the 62a McRobbie Road property, at approximately 10m, 50m and 100m downstream of the discharge point, and iii. 1 site approximately 300m downstream of the discharge point where the stream approaches McRobbie Road. 	1	Monitoring undertaken in September 2024 and April 2025. It is noted that very low or no flows at 10 m upstream and 10 m downstream sites often limit sampling, consistent with previous years

Condition Number	Consent Conditions - Kingseat DIS60401948 (wastewater discharge) and DIS60401927 (air discharge)	Compliance Rating	Comments
21	<p>On the same day that the discharge sample is collected in March each year, the consent holder shall undertake sampling to determine stream water quality at one point upstream and at other points approximately 10 m, 50 m and 100 m downstream of the discharge point (equivalent to the four points defined in items i. and ii. in the above condition for the collection of photographic records).</p> <p>Samples shall be monitored for the following parameters:</p> <ul style="list-style-type: none"> i. pH ii. Temperature iii. Biochemical Oxygen Demand (BOD5) mg O₂/L iv. Dissolved Oxygen (DO) mg O₂/L v. Ammonia (NH₃) mg N/L vi. Total inorganic nitrogen mg N/L vii. Total Phosphorus mg P/L viii. <i>Escherichia coli</i> (<i>E.coli</i>) MPN (or CFU)/100ml 	1	Stream sampling completed in March 2025. Several upstream/downstream sites were dry during autumn, restricting monitoring coverage.
22	<p>In the event of two consecutive results within twelve months for any single parameter not complying with the limits specified above, the consent holder must notify the council as soon as practicable of the exceedance in writing, outline the mitigation measures taken and advise any further measures proposed to ensure compliance. If so instructed by the Council, the consent holder must increase the frequency of monitoring for that parameter to weekly for a specified period.</p>	1	Compliant
23	<p>The results of the monitoring required by the conditions in this consent must be reported to the council by the consent holder in a quarterly monitoring report within 20 working days of the period ending 31 March, 30 June, 30 September and 31 December each year.</p>	1	Compliant

Condition Number	Consent Conditions - Kingseat DIS60401948 (wastewater discharge) and DIS60401927 (air discharge)	Compliance Rating	Comments
24	<p>The consent holder must also provide an annual report by 30 September each year to the council that:</p> <ul style="list-style-type: none"> a) Summarises all plant performance data, environmental monitoring and photographs collected for the year ending 30 June; b) Compares and analyse the plant performance data against past and anticipated future plant performance data to provide an overview of plant performance; c) Compares and provide an assessment of change in the photographs and stream water quality analyses (as required by conditions19 and 20) against previous photographic records and stream monitoring records; d) Recommends measures to mitigate any significant adverse effects of the discharge on the receiving environment. e) Includes an update of any remedial works done to address inflow and infiltration to the network. 	1	This report has been provided to Council in September 2024, meeting the consent requirement
25	A copy of the annual report must be sent by the consent holder to Ngāti Tamaoho and Te Ākitai Waiohū by 30 September each year.	1	A copy of this report was sent to mana whenua in October 2024, slightly later than the 30 September deadline
26	Odour Conditions - Beyond the boundary of the site, there must be no odour caused by discharges from the site, which in the opinion of an enforcement officer, is the cause of a noxious, dangerous, offensive or objectionable effect.	1	Compliant
27	The meteorological conditions and proximity of sensitive receptors must be considered prior to undertaking any potentially odorous activities at the site.	1	Compliant.

Appendix B. Flows and effluent quality data

Appendix B1. Flows and Rainfall

Table B1. Monthly Discharge Volumes and Rainfall at Kingseat WWTP (1 July 2024 – 30 June 2025).

Date	Effluent Volume (m ³)	Rainfall (mm)
01/07/2024	19	13.42
02/07/2024	27.1	6.71
03/07/2024	27.1	0.96
04/07/2024	21	0
05/07/2024	21	0
06/07/2024	26.5	0
07/07/2024	16.1	1.91
08/07/2024	23.7	0
09/07/2024	23.7	0
10/07/2024	19.4	0
11/07/2024	14.5	0
12/07/2024	18.7	0
13/07/2024	18.7	0
14/07/2024	17.3	0
15/07/2024	19.9	5.27
16/07/2024	19.9	0
17/07/2024	16.7	5.74
18/07/2024	17.5	0
19/07/2024	17.5	10.06
20/07/2024	33.8	11.49
21/07/2024	24	3.84
22/07/2024	24	3.35
23/07/2024	22.1	2.87
24/07/2024	22.1	0.48
25/07/2024	19.8	0.96
26/07/2024	20.9	0
27/07/2024	21.2	0
28/07/2024	20	0
29/07/2024	21.6	14.36
30/07/2024	26.4	5.75
31/07/2024	32.5	4.88
01/08/2024	37.5	16.19
02/08/2024	37.5	0
03/08/2024	37	0
04/08/2024	20.8	0
05/08/2024	21.8	0

Date	Effluent Volume (m ³)	Rainfall (mm)
06/08/2024	21.8	0
07/08/2024	17.9	0
08/08/2024	17.7	2.87
09/08/2024	19.5	1.44
10/08/2024	19.7	0
11/08/2024	23.2	0.47
12/08/2024	23.2	3.84
13/08/2024	15.1	0
14/08/2024	24.6	0
15/08/2024	24.6	0
16/08/2024	16.9	1.9
17/08/2024	24.3	17.58
18/08/2024	36.5	13.77
19/08/2024	36.5	9.03
20/08/2024	28.8	1.42
21/08/2024	25.6	0.48
22/08/2024	21.8	0
23/08/2024	18.9	0.47
24/08/2024	19.9	0.95
25/08/2024	20.9	0
26/08/2024	20.9	0
27/08/2024	20.2	10.93
28/08/2024	20.2	0
29/08/2024	20.3	6.47
30/08/2024	20.3	0
31/08/2024	22.8	9
01/09/2024	33.1	10
02/09/2024	33.1	0
03/09/2024	24.1	3.5
04/09/2024	21.4	3
05/09/2024	20	0.5
06/09/2024	18.4	3.5
07/09/2024	19.6	0
08/09/2024	21.2	3
09/09/2024	21.2	0
10/09/2024	20.1	0.5
11/09/2024	17.9	0
12/09/2024	17.7	0.5
13/09/2024	18.4	0
14/09/2024	20.9	19
15/09/2024	30	8.5
16/09/2024	30	8.5
17/09/2024	21.3	4

Date	Effluent Volume (m ³)	Rainfall (mm)
18/09/2024	21.5	0
19/09/2024	13.2	2.5
20/09/2024	46.4	34.5
21/09/2024	48.8	1
22/09/2024	37.5	0
23/09/2024	37.5	3
24/09/2024	37.5	0.5
25/09/2024	20.8	0
26/09/2024	18.3	0
27/09/2024	18	1
28/09/2024	20.1	0
29/09/2024	20.1	0
30/09/2024	19.8	0
01/10/2024	16.2	0
02/10/2024	17.6	18.53
03/10/2024	40.2	16.58
04/10/2024	37.5	0
05/10/2024	33.6	1.95
06/10/2024	22.5	20.97
07/10/2024	37.5	4.38
08/10/2024	31.6	0.98
09/10/2024	24	4.88
10/10/2024	20.4	0
11/10/2024	19	0
12/10/2024	20.4	0
13/10/2024	19.8	7.8
14/10/2024	21.4	3.9
15/10/2024	17.2	0
16/10/2024	20.6	0.49
17/10/2024	17.1	0
18/10/2024	16.7	0
19/10/2024	18.3	0
20/10/2024	18.8	0
21/10/2024	19.8	2.5
22/10/2024	16.9	0
23/10/2024	17	0
24/10/2024	11.4	0
25/10/2024	18.9	0
26/10/2024	18.7	16
27/10/2024	16.2	0
28/10/2024	17.9	2
29/10/2024	16.6	1.5
30/10/2024	17.2	2.5

Date	Effluent Volume (m ³)	Rainfall (mm)
31/10/2024	15.6	0.5
01/11/2024	13.5	0
02/11/2024	16.9	10.5
03/11/2024	17.6	0
04/11/2024	11.6	0
05/11/2024	13.8	0
06/11/2024	24.7	0
07/11/2024	17.3	0
08/11/2024	18.7	0
09/11/2024	18.7	0
10/11/2024	18.9	3.5
11/11/2024	18.6	3.5
12/11/2024	17.4	0
13/11/2024	16.2	0
14/11/2024	15.1	1.5
15/11/2024	30.2	36
16/11/2024	23.1	0.5
17/11/2024	19.1	1
18/11/2024	20	0
19/11/2024	16	0
20/11/2024	15.6	0
21/11/2024	14.5	5.5
22/11/2024	17.7	0.5
23/11/2024	16.6	0
24/11/2024	16.5	0
25/11/2024	20.3	0
26/11/2024	16.6	0.5
27/11/2024	17.8	0
28/11/2024	12.7	0
29/11/2024	17.9	0
30/11/2024	17.3	8.5
01/12/2024	17.6	1.42
02/12/2024	17.3	0
03/12/2024	13.9	0
04/12/2024	15.8	0
05/12/2024	15	0
06/12/2024	14.4	0
07/12/2024	18.3	0
08/12/2024	17.6	1.9
09/12/2024	17.5	4.76
10/12/2024	13.2	0
11/12/2024	16.3	28.5
12/12/2024	15	13.04

Date	Effluent Volume (m ³)	Rainfall (mm)
13/12/2024	16.4	0.96
14/12/2024	15.3	0
15/12/2024	18.1	0
16/12/2024	16.4	24.63
17/12/2024	11.6	0
18/12/2024	15.5	0
19/12/2024	13.7	0
20/12/2024	12.8	0.97
21/12/2024	14.4	0
22/12/2024	15.6	0
23/12/2024	17.5	1.45
24/12/2024	18.9	0
25/12/2024	18.9	0.48
26/12/2024	18.5	14.01
27/12/2024	17.9	0.48
28/12/2024	15.2	0
29/12/2024	15.2	0
30/12/2024	14.5	0.97
31/12/2024	15.4	4.83
01/01/2025	15.3	0.48
02/01/2025	14.7	1.45
03/01/2025	19.4	3.86
04/01/2025	19.3	22.22
05/01/2025	14.8	6.76
06/01/2025	14.4	0
07/01/2025	14.6	0
08/01/2025	15.5	0
09/01/2025	13.8	0
10/01/2025	15.2	0
11/01/2025	16.1	0
12/01/2025	16.5	0
13/01/2025	18.8	0
14/01/2025	16.1	0
15/01/2025	15.9	0
16/01/2025	15.4	0
17/01/2025	14.1	0
18/01/2025	11.3	0
19/01/2025	11.9	0
20/01/2025	17	0
21/01/2025	18	5.31
22/01/2025	17.8	0
23/01/2025	16.9	0
24/01/2025	19.5	0

Date	Effluent Volume (m ³)	Rainfall (mm)
25/01/2025	11.6	4.35
26/01/2025	18.7	20.28
27/01/2025	18.9	0.97
28/01/2025	17	0
29/01/2025	17.9	0
30/01/2025	4.9	0
31/01/2025	10.9	0
01/02/2025	17.8	0
02/02/2025	19.1	0
03/02/2025	18.4	2.5
04/02/2025	16.2	0
05/02/2025	16.7	0
06/02/2025	17.4	0
07/02/2025	23.1	0
08/02/2025	23.1	1.5
09/02/2025	18	0
10/02/2025	14.9	0
11/02/2025	17.1	12
12/02/2025	16.7	0
13/02/2025	16.2	0
14/02/2025	18.3	4.5
15/02/2025	18.5	0.5
16/02/2025	19.4	0
17/02/2025	17.1	0.5
18/02/2025	17.1	1
19/02/2025	14.3	0
20/02/2025	14.4	0
21/02/2025	21.2	0
22/02/2025	21.1	0
23/02/2025	18.9	0
24/02/2025	10.9	0
25/02/2025	21.3	0
26/02/2025	15.5	0
27/02/2025	16.3	0
28/02/2025	12.3	0
01/03/2025	23.4	0
02/03/2025	20	0
03/03/2025	18.6	0
04/03/2025	17.5	16.5
05/03/2025	16.6	0
06/03/2025	16.9	0
07/03/2025	16.7	0
08/03/2025	8.6	0

Date	Effluent Volume (m ³)	Rainfall (mm)
09/03/2025	10.4	0
10/03/2025	21.6	0
11/03/2025	17.9	2.5
12/03/2025	16.1	2
13/03/2025	15.2	0
14/03/2025	13.6	0
15/03/2025	26.2	0
16/03/2025	17.3	0
17/03/2025	15.3	2.5
18/03/2025	16.1	2.5
19/03/2025	19.2	17
20/03/2025	17.7	0
21/03/2025	18	0
22/03/2025	18.3	0
23/03/2025	21	0
24/03/2025	17.5	0
25/03/2025	16.3	0
26/03/2025	16.9	0
27/03/2025	14.1	0
28/03/2025	18.7	0
29/03/2025	14.5	0
30/03/2025	20.4	0
31/03/2025	17.1	0
01/04/2025	6.9	0
02/04/2025	17.1	0.94
03/04/2025	14.7	10.38
04/04/2025	30.1	55.68
05/04/2025	22.6	0.47
06/04/2025	19.3	0
07/04/2025	19.1	2.36
08/04/2025	19.9	13.21
09/04/2025	19.9	0
10/04/2025	18.7	0
11/04/2025	18.7	0
12/04/2025	20.1	0
13/04/2025	20.1	0
14/04/2025	19.4	0
15/04/2025	19.4	0
16/04/2025	19.7	0.47
17/04/2025	19.7	4.72
18/04/2025	20.9	8.3
19/04/2025	61.9	38.41
20/04/2025	37.6	10.38

Date	Effluent Volume (m ³)	Rainfall (mm)
21/04/2025	45.8	0
22/04/2025	45.8	0.47
23/04/2025	37.5	0
24/04/2025	26.2	0
25/04/2025	19.1	0
26/04/2025	19.1	0
27/04/2025	20.6	16.17
28/04/2025	25.4	3.17
29/04/2025	25.4	4.72
30/04/2025	24.2	5.19
01/05/2025	24.2	11.33
02/05/2025	27.5	2.83
03/05/2025	27.5	0
04/05/2025	20.6	0
05/05/2025	16.6	0
06/05/2025	22.1	0
07/05/2025	22.1	0
08/05/2025	18.5	1.41
09/05/2025	35.7	46.24
10/05/2025	37.5	0
11/05/2025	37.5	0
12/05/2025	23	0
13/05/2025	23	4
14/05/2025	25	0.5
15/05/2025	25	0
16/05/2025	18.1	0
17/05/2025	26	0
18/05/2025	26	2.5
19/05/2025	17.6	1
20/05/2025	17.6	0
21/05/2025	24.6	0
22/05/2025	24.6	0
23/05/2025	24.6	0
24/05/2025	24.6	0
25/05/2025	22.4	0
26/05/2025	20	21.5
27/05/2025	27.9	12
28/05/2025	27.9	5
29/05/2025	18.7	13
30/05/2025	22.3	4.5
31/05/2025	22.3	0.5
01/06/2025	21.2	0
02/06/2025	20.6	2

Date	Effluent Volume (m ³)	Rainfall (mm)
03/06/2025	21	3
04/06/2025	37.5	41.5
05/06/2025	40.6	2.5
06/06/2025	51.9	18.5
07/06/2025	51.9	4
08/06/2025	37.6	6.46
09/06/2025	41.4	12.54
10/06/2025	49.5	36
11/06/2025	91.1	2.5
12/06/2025	91.1	14
13/06/2025	65.8	18.5
14/06/2025	65.8	4
15/06/2025	40.1	0.5
16/06/2025	40.1	0
17/06/2025	37.6	0
18/06/2025	31	0
19/06/2025	23	12.61
20/06/2025	37.5	7.39
21/06/2025	37.5	0.5
22/06/2025	37.5	0
23/06/2025	37.5	0.5
24/06/2025	24.1	0
25/06/2025	23.7	2.15
26/06/2025	25.2	0.85
27/06/2025	37.6	42
28/06/2025	69.5	9
29/06/2025	69.5	2
30/06/2025	57.5	0.5

Appendix B2. Effluent Quality Parameters

Table B2. Effluent quality results at Kingseat WWTP (1 July 2024 – 30 June 2025).

Date	TSS (mg/L)	cBOD5 (mg/L)	NHX-N (mg/L)	E. coli (cfu/100mL)	Dissolved Oxygen (mg/L)	Temperature (°C)	pH (SU)
10/07/2024	21.8	5.4	0.4	2			
24/07/2024	35	5	0.4	98			
31/07/2024	28	5.7	0.4	2			
01/08/2024					6.8	14.2	7.1
07/08/2024					11.54	14.8	7
12/08/2024					11.18	16.3	7.5

14/08/2024	39	11	0.4	2			
21/08/2024	5.2	2.1	0.4	2			
26/08/2024					11.2	14.9	7
28/08/2024	16	3.5	0.4	2			
02/09/2024					11.6	14.5	7
11/09/2024	20	3.4	0.13	2			
17/09/2024					9.03	18.1	7
23/09/2024					9.52	18.7	6.9
25/09/2024	18	3.8	0.071	2			
02/10/2024					10.2	18.9	7
09/10/2024	25	1.9	0.093	2			
14/10/2024					9.62	18.7	7.1
23/10/2024	9	1.5	0.07	2			
25/10/2024					8.1	18.6	7.1
11/11/2024					8.27	19.9	7.2
13/11/2024	12	1.7	0.013	2			
18/11/2024					8.68	19	7.2
25/11/2024					8.55	18.5	7.3
27/11/2024	15	1.1	0.018	2			
05/12/2024					8.01	21.7	7.1
09/12/2024					8.89	21.6	7
11/12/2024	9.6	2.3	0.012	3			
23/12/2024					7.56	21.9	6.4
24/12/2024	9.8	1.8	0.046	2			
06/01/2025					7.9	19.4	7.1
08/01/2025	13	2	0.016	13			
17/01/2025					8.89	21.9	7.2
22/01/2025	30.8	3	74	50			
24/01/2025					7.39	22.3	6.7
29/01/2025	27	2.5	0.054	2			
12/02/2025	25.6	2.4	0.14	2			
26/02/2025	15	1.1	0.033	26			
28/02/2025					8.6	21.4	7.4
07/03/2025					9.06	18.7	7.4
12/03/2025	12	1.8	0.035	2			
14/03/2025					8.97	19.3	7.4
26/03/2025	1	1	0.068	2			
28/03/2025					8.92	21.2	7.1
03/04/2025					8.02	18.9	7.1
09/04/2025	7.8	1.6	0.063	2			
23/04/2025	5.8	0.9	0.03	2			
09/05/2025					8.96	21.8	7
14/05/2025	6.8	1.7	0.05	2			
27/05/2025					6.97	17.5	7.1

28/05/2025	8	0.8	0.015	2			
06/06/2025					8.73	17.3	7.1
11/06/2025	22.6	3	0.028	2	8.33	16.9	7
23/06/2025					8.2	15.6	7.3
25/06/2025	8.6	1.9	0.084	230			
27/06/2025					8.35	13.1	7.2

Appendix C. Data Source

Table C-1: Download location of environmental monitoring data used in this report

Category	Parameter	Source platform	Tag/ID or Form
Effluent volume	Daily effluent discharge	Pi	DTKGS_55_FQI_001_VOLUME24H
Environmental – External	Rainfall	Auckland Council Environmental Data Portal	Location – Karaka (Waitangi @ Diver Road, reference site)
Effluent quality	cBOD ₅	Pi	DTKGS_48_13_UVE_BOD
Effluent quality	TSS	Pi	DTKGS_48_13_UVE_TSS
Effluent quality	NH ₄ -N (Ammoniacal N)	Pi	DTKGS_48_13_UVE TNH3N
Effluent quality	E. Coli	Pi	DTKGS_48_13_UVE_ECOLI
Effluent quality	DO	Infrastructure Data – Field Data Form	DTKGS Field data
Effluent quality	pH	Infrastructure Data – Field Data Form	DTKGS Field data
Effluent quality	Temperature	Infrastructure Data – Field Data Form	DTKGS Field data

Appendix D. Photographic Record

Monitoring locations – 10 March 2025



Figure D-1: 10 meters Upstream site, looking downstream



Figure D-2: Discharge mixing zone



Figure D-3: 10 m downstream site, looking upstream



Figure D-4: 50 m downstream sampling site; photo illustrates lack of flow preventing sample collection



Figure D-5: 100 m downstream site, showing insufficient water for sampling



Figure D-6: 300 m downstream sampling site